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Forensic Science | 3.3 Glass Analysis

Introduction:

In this assignment, you will read through the account of a real crime that took place in northwest Oregon in February of 1987. Below are the basic details of the case that should get you started, but you may want to do some of your own research to address the questions that follow.

Susan Nutt (1987)

At 9:30 P.M. on a cloudy, dark night in February 19-year-old Craig Elliott Kalani went for a walk in his neighborhood in northwest Oregon but never returned home. A hit-and-run driver killed him. Crime-scene investigators collected pieces of glass embedded in Craig's jacket and other glass fragments found on the ground near his body. Police searched for a vehicle that had damages consistent with a hit-and-run accident. They found a car with those types of damages that belonged to a woman named Susan Nutt. In order to connect Ms. Nutt and her car with the crime, the police had to match the glass from the crime scene to the glass in her car.

Solving the Crime:

1. Sometimes identifying one type of glass or glass fragment at a crime scene may be critical in solving a crime, but the largest database includes 304,107 glass compositions, so identifying one of them can be daunting. Although chemists can identify glass by more conclusive methods involving elemental analysis, density may still be used as a screening method.

   Here is some hypothetical glass evidence from the scene of the accident. Using density, identify each glass fragment by using the known data given in the table provided. (4 points)

Sample 1: ____Vehicle Headlight_____
mass = 40.2 g volume = 16 mL

Sample 2:_____Optical_____
mass = 96.2 volume = 26 mL

Sample 3:_____Tempered_____
mass = 59.6   volume = 20 mL

Sample 4:_____Gorilla Glass_____
mass = 53.9 g volume = 22 mL

Type of Glass	Density
Gorilla Glass (iPhone screen)	2.45 g/cm^3
Tempered (Auto window)	2.98 g/cm^3
Optical (eyeglass)	3.70 g/cm^3
Vehicle Headlight	2.47-2.63 g/cm^3

2. As the lead crime scene investigator, explain how you would collect and preserve the glass evidence. (4 points)
Collect from the jacket and from the ground. Place each type of glass in separate containers.

3. List the characteristics of glass that would make it valuable evidence in this case. (3 points)
Type of glass, what kind of car it came from

4. The density information is important but describe any additional tests you would run in the lab and the data you would hope to collect to solve the case. (3 points)
Refraction index to make sure it was the same.

5. What information from the glass investigation would allow you to successfully convict Susan Nutt in this case? (3 points)
If it was the same type of glass that her car had.

6. List at least one other type of class evidence and one other type of individual evidence that would possibly be at the scene that would help to convict Ms. Nutt. (2 points)
   a. Class evidence: Paint from the car at the scene
   b. Individual evidence: Hair or blood of the victim on the car

7. What was the actual outcome of this case? (1 point) Susan got 5 years in prison and 5 years of probation.